

Appl. No.: 10/720,658
Amdt. dated 05/13/2008
Reply to Office action of February 22, 2008

REMARKS/ARGUMENTS

Claims 1-10 and 12-29 are all the claims currently pending in the application. Based on the following remarks, Applicant requests reconsideration of the application and allowance of the claims.

I. Rejection of Claims 1-9, 16-17 & 21-23 Under 35 U.S.C. § 102(e)

Claims 1-9, 16-17 and 21-23 stand rejected under 35 U.S.C. § 102(e) as allegedly being anticipated by Kadous (U.S. Patent No. 6,636,568; hereinafter “Kadous”)

Claim 1 requires “An apparatus comprising:” *inter alia*, “*a first mapper* adapted to receive first representations of a first portion of communication data, said first mapper for mapping the first representations of the first portion of the communication data into first mapped values according to a first mapping scheme; and *a second mapper* adapted to receive second representations of a second portion of the communication data, said second mapper for mapping the second representations of the communication data into second mapped values according to a second mapping scheme, *the second mapping scheme exhibiting a mapping property that differs with the first mapping scheme...*”

Applicant again submits that Kadous does not teach or suggest at least the above features of claim 1. As noted above claim 1 recites “*the first mapper transmits* the first mapped values to *a first antenna transducer* among a plurality of antenna transducers and wherein the *second mapper transmits* the second mapped values to a *second antenna transducer* among the plurality of antenna transducers ...” As pointed out in the Amendment filed December 14, 2007, it can be seen in FIG. 5 of Kadous, that in contrast to claim 1, the symbol mapping elements 516a, 516t, at best, transmit modulation symbols to an inverse Fourier transform (IFFT) units 522a, 522t of a TX MIMO processor 120a. (Col. 16, lines 53-58) The IFFT units 522a, 522t convert the modulation symbols to OFDM symbols and sends the OFDM symbols to cyclic prefix generators 524a, 524t and the “[c]yclic prefix generator[s] then provide[] a stream of transmission symbols to an associated transmitter” 122a, 122t. Given that the symbol mapping elements 516a, 516t do not transmit mapped values to first and second antenna transducers, and instead disclose that the symbol mapping elements 516a, 516t sends modulation symbols to IFFT units 522a, 522t, Kadous is incapable of teaching or suggesting that a “*first mapper transmits* the first mapped

values to *a first antenna transducer* among a plurality of antenna transducers and ... the *second mapper transmits* the second mapped values to a *second antenna transducer* among the plurality of antenna transducers,” as required by claim 1. Additionally, Kadous explains that if OFDM is not employed, then TX MIMO processor 120a, which is not the symbol mapping elements 516a, 516t (alleged first and second mappers), provides the modulation symbol stream received “from each symbol mapping element 516” to the associated transmitter 122. (Col. 17, lines 7-10 & FIG. 5) In this regard, Kadous describes that each transmitter 122 receives a respective modulation symbol stream from the TX MIMO processor 120a to generate a modulated signal, which is then transmitted from the associated antenna 124. (Col. 17, lines 11-15) As such, Kadous, at best, explains that in situations in which OFDM is not employed or utilized therein that the TX MIMO processor 120, receives modulation streams from the symbol mapping element 516 and that the TX MIMO processor 120a, not the symbol mapping elements 516a and 516t, “provides the modulation symbol stream to the associated transmitter 122,” which is not the antenna 124 (alleged first and second antenna transducers). And Kadous, at best, discloses that each transmitter 122a, 122t which receives the modulation symbol stream from the TX MIMO processor 120a provides a modulated signal to the associated antenna 122a, 122t.

Given the above, Kadous is simply incapable of teaching or suggesting the symbol mapping element 516a (alleged first mapper) transmits first mapped values to an antenna 124a (alleged first antenna transducer) and that the symbol mapping element 516t (alleged second mapper) transmits second mapped values to an antenna 124t (alleged second antenna transducer), as required by claim 1. Rather, the elements of the system of Kadous simply do not correspond to the features recited by claim 1. MPEP § 2131 requires that to anticipate a claim, the elements of a reference “must be arranged as required by the claims. In contrast to the mandate of MPEP § 2131, here the interrelationship of claim elements is simply not met Kadous because the symbol mapping elements 516 do not transmit modulation symbol streams to respective antennas 124, as required by claim 1. Instead any transmission of modulation symbols is provided by the TX MIMO processor 120a and transmitter 122 to antennas 124. For at least this reason, Kadous does not teach or suggest features of claim 1. As pointed out in column 4, lines 11-22 of Kadous, even in situations wherein OFDM is employed the modulated symbols are provided to TX MIMO processor 120 which “further processes the modulation symbols (e.g., OFDM) and

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the TX MIMO processor 120 provides the modulation symbol streams to transmitters 122 which receive and further process a symbol stream to provide one or more analog signals and “conditions (e.g., amplifies, filters, and upconverts) the analog signals to provide a modulated signal” that is then transmitted to NT antennas 124. The elements of claim 1 recites that the first and second mappers transmit first and second mapped values to first and second antenna transducers, respectively. The symbol mapping elements 516 of Kadous simply do not perform this function. Rather additional processing modulation symbols is performed by the TX MIMO processor 120 and the transmitters 122, which then provides modulated symbols to the antennas 124. As such, the interrelationship of claim elements is simply not met Kadous, as noted above.

Moreover, Applicant note that in rejecting claim 1, the Examiner continues to rely on column 16, lines 1-52 and FIG. 5 of Kadous for the proposition that Kadous discloses features of claim 1. Applicant again respectfully disagrees.

As pointed out in the Amendment filed December 14, 2007, in contrast to claim 1, column 16, lines 1-52 of Kadous, at best, discloses that “coded and interleaved bits from each channel interleaver 514 are provided to a respective symbol mapping element 516 which maps the[] bits to form modulation symbols” and explains that the “particular modulation scheme to be implemented by each symbol mapping element 516 is determined by the modulation control provided by controller 130.” Column 16, lines 1-52 further explains that each symbol mapping element 516 “maps … corresponding to the selected modulation scheme (e.g., QPSK, M-PSK, M-QAM, or some other modulation scheme).” (emphasis added) Column 4, lines 4-10 also, at best, explains that controller 130 may utilize controls in order to “modulate[] (i.e., symbol mapped) based on a particular modulation scheme (e.g., BPSK, QSPK, M-PSK, or M-QAM) selected for that data stream to provide modulation symbols.” (emphasis added) Nowhere in the cited portion or any other portion of Kadous is there any mention, teaching or suggestion relating to each of the symbol mapping elements 516a, 516t exhibiting differing mapping properties, as required by claim 1. Kadous is simply altogether silent and does not contemplate that the symbol mapping element 516a (alleged first mapper) is capable of using one modulation scheme and that the symbol mapping element 516t (alleged second mapper) is capable of using a differing modulation scheme, as required by claim 1. Rather, the cited portion and indeed all of Kadous, at best, discloses that the controller 130 may select “a particular” or the same

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modulation scheme (e.g., QPSK) for both of the symbol mapping elements 516a, 516t from among various modulation schemes “(e.g., BPSK, QSPK, M-PSK, or M-QAM)” in order to modulate interleaved bits provided by channel interleavers 514a, 514t, respectively. (Col. 4, lines 7-10)

As noted in the Amendment filed December 14, 2007, given that Kadous, at best, discloses that the symbol mapping elements 516a, 516t may use the same modulation scheme that may be selected from various modulation schemes, Kadous is incapable of teaching or suggesting that the symbol mapping element 516a has a mapping scheme which exhibits a mapping property that differs with the symbol mapping element 516t, as required by claim 1. Applicant submits that the Examiner is simply giving Kadous credit for more than it actually discloses. For at least this additional reason, Kadous does not teach or suggest all of the features of claim 1.

Based on at least all the foregoing reasons, Applicant submits that Kadous does not teach or suggest all of the features of claim 1. Applicant therefore respectfully requests the Examiner to reconsider and withdraw the § 102(e) rejection of claim 1 and its dependent claims 2-9.

Since claim 16 and 21 contain features that are analogous to, though not necessarily coextensive with, the features recited in claim 1, Applicant respectfully submits that claim 16 and its dependent claim 17 as well as claim 21 and its dependent claims 22-23 are patentable at least for reasons analogous to those submitted for claim 1.

Applicant again submits that claim 5 recites independently patentable subject matter given that Kadous fails to teach or suggest “elements of the first set of mapped *values differing in value* with elements of the second set of mapped values,” “the first set of mapped values and the second set of mapped values ... respectively, are formed of *mutually-exclusive elements*,” as required by claim 5 in combination with other recitations of the claims. In rejecting claim 5, the Examiner suggests that column 16, lines 36-52 of Kadous discloses the features of claim 5. (See pgs. 5 & 6 of the Office Action) Applicant again respectfully disagrees. As pointed out in the Amendment filed December 14, 2007, nowhere in the cited portion or any other portion of the combination is there any mention, teaching or suggestion relating to a first mapper (to the extent that the Examiner is suggesting that the symbol mapping element 516a corresponds to the claimed first mapper) that maps a first set of mapped values and a second mapper (to the extent

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that the Examiner is suggesting that the symbol mapping element 516t corresponds to the claimed second mapper) that maps a second set of mapped values where values of the first set of mapped values and the second set of mapped values *differ and are formed of mutually exclusive elements*, as claimed. The cited portion, i.e., column 16, lines 36-52 of Kadous, at best, discloses that “[e]ach symbol mapping element 516 maps each non-binary symbol to a specific point in a signal constellation. Contrary to the Examiner’s general assertion the cited portion, and indeed all portions, of Kadous are simply altogether silent regarding the makeup and content of any of the values generated from the symbol mapping elements 516a, 516t and as known to skilled artisans it certainly is not necessarily the case that the symbol mapping elements 516a generate values that differ and that are mutually exclusive to each other, as required by claim 5. The Examiner is giving the reference credit for more than it actually teaches. Contrary to the Examiner’s assertion in the Office Action,¹ even assuming *arguendo* that the Kadous discloses differing mapping schemes, such disclosure does not demonstrate that each element of a first set of mapped values differs in value with elements of a second set of mapped values. Some of the elements (e.g., one element) of the first set of mapped values could have the same value as some (e.g. one element) elements in the second set of mapped values. As known to skilled artisans, “[t]he first and second mapping schemes [must be] … *selected* to exhibit *differing* properties and … are *selected* such that the constellation sets of the separate mapping schemes comprise *dissimilar* symbol points” which “differ in symbol values.” (See pgs. 6 and 13 of the specification) Based on at least the foregoing, Applicant respectfully requests reconsideration and withdrawal of the § 102(e) rejection of claim 5 for this additional reason.

Regarding claim 6, Applicant submits that claim 6 recites independently patentable subject matter given that the Kadous fails to teach or suggest that “the mapping property exhibited by the second mapping scheme that differs with that of the first mapping scheme comprises *vector magnitudes* that differ,” as required by claim 6. In rejecting claim 6, the Examiner relies on column 16, lines 36-52. (See pg. 6 of the Office Action) As noted above, with respect to claim 1, the cited portion, at best, discloses the symbol mapping elements 516a, 516t may use the same modulation scheme that may be selected from various modulation

¹ See pg. 6 of the Office Action.

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schemes. Even assuming *arguendo* that the symbol mappers 516 can use differing mapping schemes (an assertion with which Applicant expressly disagrees) as contended by the Examiner, Kadous still does not teach all of the features of claim 6. Contrary to the Examiner's assertion nowhere in Kadous is there any mention, teaching or suggestion relating the mapping property exhibited by the second mapping scheme (QPSK according to the Examiner) that differs with that of the first mapping scheme (BPSK according to the Examiner) comprises vector magnitudes that differ, as required by claim 6. (See pg. 3 of the Office Action) Kadous is simply altogether silent regarding usage of two differing mapping schemes in which the mapping schemes comprises vector magnitudes that differ. Even assuming *arguendo* that “[t]he I and Q component values of all of the symbols in a QPSK constellation are different from I and Q component values of all of the symbols in a BPSK constellation,” as contended by the Examiner on page 3 of the Office Action, it is not necessarily the case that each value within the QPSK and the BPSK comprises *vector magnitudes* that differ. As known to those skilled in the art, values within a QPSK constellation or a BPSK constellation may be different, although they need not be, and there is no requirement that each value in a QPSK constellation (alleged second mapping scheme) and each value in a BPSK constellation (alleged first mapping scheme) comprises a vector magnitude that differ, as claimed. For at least this additional reason, claim 6 is patentable and the Applicant requests the Examiner to reconsider and withdraw § 102(e) rejection of dependent claim 6.

II. Rejection of Claim 10 Under 35 U.S.C. § 103(a)

Claim 10 stands rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Kadous in view of Li et al. (U.S. Patent No. 7,068,628; hereinafter “Li”). Applicant respectfully traverses this rejection for at least the following reasons.

As discussed above, Kadous is deficient vis-à-vis independent claim 1 and Li does not compensate for the deficiencies of Kadous. Applicant therefore respectfully requests the Examiner to reconsider and withdraw the § 103(a) rejection of dependent claim 10.

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III. Rejection of Claims 12-15 & 18-20 Under 35 U.S.C. § 103(a)

Claims 12-15 and 18-20 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Kadous in view of U.S. Patent No. 6,731,668 by Ketchum. Applicant respectfully traverses this rejection for at least the following reasons.

As discussed above, Kadous is deficient vis-à-vis independent claims 1 and 11 and Ketchum does not compensate for the deficiencies of Kadous. Applicant therefore respectfully requests the Examiner to reconsider and withdraw the § 103(a) rejection of dependent claims 12-15 and 18-20.

IV. Rejection of Claims 27-29 Under 35 U.S.C. § 103(a)

Claims 27-29 are rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Kadous in view of the article entitled *2003 4th IEEE Workshop on Signal Processing Advances in Wireless Communications* by Kammoun et al (hereinafter “Kammoun”). Applicant respectfully traverses this rejection for at least the following reasons.

As discussed above, Kadous is deficient vis-à-vis independent claims 1, 16 and 21 and Kammoun does not compensate for the deficiencies of Kadous. Applicant therefore respectfully requests the Examiner to reconsider and withdraw the § 103(a) rejection of dependent claims 27-29.

V. Conclusion

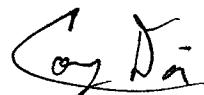
In view of the foregoing remarks, Applicant respectfully submits that all of the claims of the present application are in condition for allowance. It is respectfully requested that a Notice of Allowance be issued in due course. Examiner Dean is encouraged to contact Applicant’s undersigned attorney to resolve any remaining issues in order to expedite examination of the present application.

It is not believed that extensions of time or fees for net addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 C.F.R. § 1.136(a), and any fee

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required therefore (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 16-0605.

Respectfully submitted,



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